U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-206/90-39

Docket No. 50-206

License No. DPR-13

Licensee: Southern California Edison Company
Irvine Operations Center
23 Parker Street
Irvine, California 92718

Facility Name: San Onofre Nuclear Generating Station Unit 1

Inspection at: San Clemente, California

Inspection conducted: December 3 - 6, 1990

Inspectors: F. Gee, Reactor Inspector
P. Loeser NRR/SICB
J. Fehringer, INEL

Approved by: _____ for 12-21-90
F. R. Huey, Chief Date Signed
Engineering Section

Summary:

Inspection During December 3 - 6, 1990 (Report 50-206/90-39)

Areas Inspected: An unannounced inspection was conducted to verify the implementation of the Anticipated Transients Without Scram Mitigating System Actuation Circuitry (AMSAC) and to assess its conformance with 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants." Inspection procedure 30703 and Temporary Instruction 2500/020 (25020) were used as guidance for this inspection.

Results:

General Conclusions and Specific Findings:

The licensee has installed the AMSAC equipment adequately to meet the requirements of 10 CFR 50.62. In general, the physical arrangement and installation were done in accordance with the NRC staff Safety Evaluation Report (SER) on the system.

Significant Safety Matters: None

Summary of Violations and Deviations: None

Open Items Summary: One followup item was closed, and one item was opened.

Details

1. Persons Contacted

*D. Brevig, Onsite Nuclear Licensing Supervisor
*W. Morris, Onsite Nuclear Licensing Engineer
*C. Brandt, Quality Assurance Engineer
*M. Ramsey, Quality Assurance Supervisor
*I. Katter, Engineering Supervisor
*G. Hollaway, Project Engineer
*T. Elkins, Nuclear Construction
*R. Plappert, Supervisor, Technical Support & Compliance
*J. Jamerson, Onsite Nuclear Licensing Engineer

*Attended the exit meeting on December 6, 1990.

The inspectors also held discussions with other licensee personnel during the course of the inspection.

2. Introduction

The purpose of this inspection was to evaluate the implementation of the Anticipated Transients Without Scram Mitigating System Actuation Circuitry (AMSAC) design and installation by the licensee to ensure that the implementation was in accordance with NRC Safety Evaluation Report (SER) addressing the SONGS-1 AMSAC design. The post-implementation inspection was conducted in accordance with the guidelines established in the NRC Inspection Manual Temporary Instruction (TI) 2500/20 Revision 2, dated May 4, 1990.

3. Technical Evaluation

3.1 General

At SONGS-1, the auxiliary feedwater actuation system (AFAS) and the auxiliary feedwater system (AFWS) were upgraded following the TMI-2 accident in accordance with the resulting TMI action plan. The AFWS at SONGS-1 consisted of two independent and redundant trains, Train A and Train B. Since only one train was required for AFAS/AFWS independence from the reactor protection system (RPS), the licensee selected Train B as part of the AMSAC. The licensee stated that AFAS/AFWS Train B was in compliance with the requirements of 10 CFR 50.62 for Westinghouse designed plants.

The AFAS for Train B received independent steam generator level signals from three narrow range level transmitters, one on each steam generator. The Train B AFAS input circuitry was arranged in a 2 out of 3 logic, and the bistable setpoints were set at 5% of steam generator narrow range level. Upon actuation, the Train B AFAS initiated its respective AFWS.

The existing AFAS actuation circuitry was similar to the Westinghouse generic AMSAC Logic 1, as defined in WCAP-10858-P-A, Rev. 1, "AMSAC Generic Design Package." The logic sensed conditions indicative of an

ATWS event by monitoring the steam generator water level and activating the AMSAC (Train B) when water level was below the low level setpoint.

In keeping with the requirements of the ATWS Rule, the licensee added circuitry to the output of the Train B AFAS to initiate a diverse turbine trip (DTT). There were no operational bypasses associated with the DTT. The circuit was armed whenever the turbine was on-line.

The SONGS-1 ATWS design did not meet all of the assumptions in the staff approved Westinghouse Topical Report, WCAP-10858-P-A, "AMSAC Generic Design Package." On July 23, 1990, the licensee submitted an updated package that identified those plant specific design features and analysis assumptions which differed from the generic plant design performed by Westinghouse. The NRC Staff SER stated that the SONGS-1 ATWS mitigative system design was acceptable and was in compliance with the ATWS Rule, 10 CFR 50.62, paragraph (c)(1). The staff's approval was subject to completion of the following confirmatory items:

1. Isolation Device Qualification Tests - To verify that the electrical isolator test data was applicable to the SONGS-1 plant and that the maximum credible fault testing was performed.

2. Human Factors Engineering Review - To verify that the physical aspects of the AMSAC system went through a structured Human Factors review.

3. Means for Bypassing - To verify that leads were not required to be lifted to insert the test signal.

4. Environmental Qualification - To verify that the stated design life was justified.

5. Completion of Mitigative Action - To verify that the SONGS-1 procedures and circuitry met the completion of mitigative action requirement of the ATWS Rule.

In addition to the confirmatory items, the inspection team examined other aspects of the AMSAC such as completed work sign-offs, engineering design documents, quality assurance procedures, equipment diversity, non-safety to safety related interfaces, physical separation, bypasses, operability and surveillance requirements, maintenance procedures, training procedures and operating procedures including annunciators and annunciator response procedures.

3.2 Confirmatory Items

1. Isolation Device Qualification Tests

The SONGS-1 AMSAC design used Busmann fuses and Foxboro Spec 200 isolation devices to provide the isolation interface between the safety grade and non-safety grade components. A

qualification document review revealed that these devices appeared to be adequately qualified to perform the intended functions.

2. Human Factors Engineering Review

The SONGS-1 AMSAC design change package DCP 3407 was developed using NES&L Procedure 24-10-15 Revision 7 "Preparation, Review, and Approval of Facility Change Evaluation for SONGS 1, 2 and 3," which prescribed the method for assuring that a Human Factors review was performed and applicable standards were met. During the plant walkdown, the physical layout of the AMSAC/DTT controls and alarms were observed and all appeared to be adequate from a human factors view point.

3. Means for Bypassing

Maintenance and testing of the AMSAC/DTT was accomplished with the use of permanently installed bypasses, approved testing devices, and via permanent test points.

4. Environmental Qualification

All equipment associated with the AMSAC/DTT was located in a mild environment and were qualified as such. Therefore, the SONGS-1 maintenance and surveillance procedures were used to control the testing and replacement of components required to maintain the AMSAC/DTT operable and in the as-designed state.

5. Completion of Mitigative Action

During the review of the associated DCP for the AMSAC/DTT, it was determined that once initiated, the mitigative action went to completion and that deliberate operator action was required to reset and/or return the actuated systems to normal operating conditions.

3.3 Other Considerations

1. Completed Work

The engineering design documents appeared to be complete and adequately represented the as-built configuration of the AMSAC/DTT.

All procurement packages and purchase orders appeared to be complete and required an acceptable grade of AMSAC/DTT equipment. Physical inspection of various AMSAC/DTT components revealed that the prescribed components were adequately installed and appeared to be of adequate

grade.

The existing quality assurance program (QAP) appeared to adequately monitor the AMSAC/DTT modifications and met all of the required elements of 10 CFR 50 Appendix B with the exception of surveillance frequency which is presently under NRC generic review. SCE Nuclear Oversight Division Surveillance Reports SOS-179-90 and SOS-218-90 evaluated the AMSAC/DTT design change package, DCP 3407, and the preoperational testing of AMSAC/DTT respectively.

2. Diversity

The inspection team found that adequate diversity existed between the AMSAC/DTT and the RPS and that existing maintenance procedures and guidelines would assure that diversity was maintained over the lifetime of the systems.

3. Physical Separation

The SONGS-1 AMSAC/DTT system design required and incorporated adequate physical separation to the extent practical.

4. Bypasses

The SONGS-1 AMSAC/DTT system design did not require the use of operational bypasses.

5. Maintenance, Surveillance, Operations, and Training Procedures

A "Description of Impact" for DCP 3407 addressed the requirements and established content criteria for changes to the maintenance and surveillance and to the operations and training procedures associated with the AMSAC/DTT.

The inspection team obtained a copy of draft procedure changes for SOI-II.1.76, "Surveillance Requirement Auxiliary Feedwater System Test," and SOI-II.1.74, "Surveillance Requirement Auxiliary Feedwater System Calibration (18 Month Interval)." These procedures addressed at power testing of the AMSAC/DTT which was scheduled to be performed on 31 day intervals and a complete input-to-output testing which was scheduled to be performed each refueling outage. Operability and system down time was also adequately addressed.

The operations and training procedures were also not fully implemented at the time of this inspection. All the ATWS maintenance, surveillance, operations, and training

procedures will be reviewed in their approved forms at a later inspection (Followup Item 50-206/90-39-01).

4. Conclusions

Based on the review of the above information, plant walkdown inspections of AMSAC/DTT equipment, and interviews with the SONGS-1 personnel, the inspection team found that the SONGS-1 AMSAC/DTT design and implementation appeared to be adequate and to be in compliance with the requirements and the intent of 10 CFR 50.62.

No violations or deviations were identified.

5. (Closed) Followup Item No. 50-206/TI-00-20 Implementation of AMSAC

This inspection verified the implementation of the AMSAC in accordance with the NRC staff Safety Evaluation Report.

This item is closed.

6. Exit Meeting (30703)

The inspectors conducted an exit meeting on December 6, 1990, with members of the licensee staff as indicated in paragraph 1. During this meeting, the inspectors summarized the scope of the inspection activities and reviewed the inspection findings as described in this report.